

Frequency Mixer

TUF-ED12599/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)			RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)			RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+14dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+14	+17	+20			+14	+17	+20			+14	+17	+20
40.10	10.10	7.81	6.71	6.17	40.10	10.10	20.64	24.17	28.19	40.10	10.10	0.49	0.27	0.21
100.10	70.10	7.36	6.41	6.00	100.10	70.10	22.48	25.74	29.11	100.10	70.10	1.07	0.49	0.28
160.10	130.10	7.44	6.37	5.92	160.10	130.10	22.13	25.67	29.91	160.10	130.10	0.87	0.44	0.27
220.10	190.10	7.40	6.37	5.99	220.10	190.10	23.55	28.11	22.58	220.10	190.10	1.06	0.48	0.22
280.10	250.10	7.39	6.45	6.08	280.10	250.10	22.91	21.66	21.50	280.10	250.10	0.99	0.41	0.19
330.10	300.10	7.31	6.47	6.10	330.10	300.10	22.76	20.16	21.27	330.10	300.10	1.10	0.39	0.20
390.10	360.10	7.36	6.57	6.21	390.10	360.10	18.81	19.68	21.74	390.10	360.10	1.24	0.43	0.23
440.10	410.10	7.40	6.60	6.13	440.10	410.10	18.43	19.54	24.48	440.10	410.10	1.14	0.46	0.30
500.10	470.10	7.65	6.76	6.38	500.10	470.10	17.39	19.84	21.58	500.10	470.10	1.19	0.61	0.35
550.10	520.10	7.92	6.91	6.48	550.10	520.10	16.51	20.81	24.29	550.10	520.10	1.04	0.65	0.38
610.10	580.10	8.36	7.31	6.55	610.10	580.10	16.30	18.28	24.90	610.10	580.10	0.92	0.55	0.57
660.10	630.10	8.59	7.55	6.90	660.10	630.10	16.68	18.04	20.20	660.10	630.10	1.03	0.59	0.49
720.10	690.10	9.16	7.89	7.26	720.10	690.10	17.92	19.87	21.59	720.10	690.10	0.62	0.41	0.30
770.10	740.10	9.53	7.93	7.20	770.10	740.10	18.00	21.53	23.41	770.10	740.10	0.40	0.53	0.48
830.10	800.10	10.21	7.89	6.91	830.10	800.10	16.13	22.97	30.43	830.10	800.10	-0.31	0.72	0.79
880.10	850.10	10.54	7.97	6.89	880.10	850.10	15.31	23.13	27.34	880.10	850.10	-0.75	0.69	0.82
940.10	910.10	10.23	8.47	7.10	940.10	910.10	16.92	20.68	24.10	940.10	910.10	-0.56	0.17	0.66
990.10	960.10	9.78	8.71	7.44	990.10	960.10	18.76	19.59	22.09	990.10	960.10	-0.27	-0.11	0.41
1050.10	1020.10	9.29	8.45	7.65	1050.10	1020.10	19.47	20.60	20.76	1050.10	1020.10	0.11	0.05	0.20
1100.10	1070.10	9.16	8.37	7.76	1100.10	1070.10	18.93	20.43	20.30	1100.10	1070.10	0.16	0.06	0.11
1160.10	1130.10	8.79	8.18	7.61	1160.10	1130.10	19.75	19.37	19.82	1160.10	1130.10	0.39	0.13	0.21
1210.10	1180.10	8.69	8.15	7.63	1210.10	1180.10	20.31	19.20	18.75	1210.10	1180.10	0.51	0.18	0.26
1270.10	1240.10	8.47	7.89	7.40	1270.10	1240.10	20.14	19.04	21.31	1270.10	1240.10	0.67	0.37	0.40
1320.10	1290.10	8.48	7.77	7.13	1320.10	1290.10	19.67	21.99	24.50	1320.10	1290.10	0.83	0.57	0.56
1380.10	1350.10	8.26	7.35	6.75	1380.10	1350.10	21.77	22.18	25.07	1380.10	1350.10	0.98	0.77	0.54
1430.10	1400.10	8.19	7.06	6.58	1430.10	1400.10	22.55	21.02	24.68	1430.10	1400.10	1.14	0.88	0.45
1490.10	1460.10	7.85	6.88	6.59	1490.10	1460.10	20.99	23.71	27.03	1490.10	1460.10	1.35	0.79	0.32
1540.10	1510.10	7.71	6.77	6.49	1540.10	1510.10	19.49	23.86	27.85	1540.10	1510.10	1.68	0.78	0.33
1600.10	1570.10	7.57	6.85	6.59	1600.10	1570.10	19.30	25.33	28.63	1600.10	1570.10	1.76	0.64	0.28
1650.10	1620.10	7.62	6.81	6.56	1650.10	1620.10	18.91	26.85	29.22	1650.10	1620.10	1.90	0.70	0.27
1710.10	1680.10	7.92	6.93	6.63	1710.10	1680.10	18.28	26.27	30.72	1710.10	1680.10	1.85	0.70	0.25
1760.10	1730.10	8.34	7.03	6.70	1760.10	1730.10	18.80	25.92	29.12	1760.10	1730.10	1.63	0.75	0.27
1820.10	1790.10	9.31	7.22	6.77	1820.10	1790.10	20.45	24.32	26.83	1820.10	1790.10	1.03	0.85	0.28
1870.10	1840.10	9.93	7.53	7.00	1870.10	1840.10	27.38	24.14	26.16	1870.10	1840.10	0.58	0.72	0.24
1930.10	1900.10	11.17	7.80	6.95	1930.10	1900.10	20.88	24.63	27.02	1930.10	1900.10	-0.21	0.74	0.35
1980.10	1950.10	11.74	8.32	7.20	1980.10	1950.10	19.95	24.68	26.54	1980.10	1950.10	-0.59	0.44	0.27
2040.10	2010.10	13.12	8.79	7.27	2040.10	2010.10	15.18	23.48	23.60	2040.10	2010.10	-1.49	0.26	0.36
2090.10	2060.10	14.73	9.37	7.46	2090.10	2060.10	12.48	21.39	21.20	2090.10	2060.10	-2.62	-0.01	0.37
2150.10	2120.10	16.36	9.88	7.83	2150.10	2120.10	10.47	21.70	22.20	2150.10	2120.10	-3.62	-0.09	0.29
2200.10	2170.10	19.00	10.34	8.02	2200.10	2170.10	7.55	22.90	27.46	2200.10	2170.10	-5.64	0.03	0.23

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=350.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=150.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=550.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+17			+17			+17
340.00	10.10	6.50	10.00	160.10	6.78	540.00	10.10	6.64
325.33	24.77	6.47	50.00	200.10	6.41	530.00	20.10	6.51
310.67	39.43	6.46	90.00	240.10	6.34	520.00	30.10	6.62
296.00	54.10	6.45	130.00	280.10	6.35	510.00	40.10	6.67
281.33	68.77	6.48	170.00	320.10	6.39	500.00	50.10	6.66
266.67	83.43	6.53	210.00	360.10	6.35	490.00	60.10	6.59
252.00	98.10	6.46	250.00	400.10	6.29	480.00	70.10	6.62
237.33	112.77	6.41	290.00	440.10	6.28	470.00	80.10	6.84
222.67	127.43	6.36	330.00	480.10	6.28	460.00	90.10	6.70
208.00	142.10	6.29	370.00	520.10	6.29	450.00	100.10	6.63
193.33	156.77	6.27	410.00	560.10	6.29	440.00	110.10	6.60
178.67	171.43	6.14	450.00	600.10	6.32	430.00	120.10	6.63
164.00	186.10	6.25	490.00	640.10	6.42	410.00	140.10	6.45
142.00	208.10	6.26	530.00	680.10	6.48	400.00	150.10	6.52
127.33	222.77	6.32	570.00	720.10	6.46	380.00	170.10	6.59
105.33	244.77	6.32	610.00	760.10	6.59	370.00	180.10	6.64
90.67	259.43	6.22	650.00	800.10	6.57	350.00	200.10	6.61
68.67	281.43	6.25	690.00	840.10	6.61	340.00	210.10	6.61
54.00	296.10	6.42	730.00	880.10	6.88	320.00	230.10	6.62
32.00	318.10	6.51	770.00	920.10	7.05	310.00	240.10	6.55
17.33	332.77	6.53	810.00	960.10	7.32	290.00	260.10	6.60
42.39	392.49	6.44	850.00	1000.10	7.51	280.00	270.10	6.54
107.17	457.27	6.43	890.00	1040.10	7.73	260.00	290.10	6.65
204.35	554.45	6.42	930.00	1080.10	8.06	250.00	300.10	6.74
269.13	619.23	6.45	970.00	1120.10	8.36	230.00	320.10	6.79
366.30	716.40	6.69	1010.00	1160.10	8.61	220.00	330.10	6.82
431.09	781.19	6.70	1050.00	1200.10	8.96	200.00	350.10	6.80
528.26	878.36	7.10	1070.00	1220.10	9.15	190.00	360.10	6.74
593.04	943.14	7.61	1110.00	1260.10	9.31	170.00	380.10	6.78
690.22	1040.32	8.18	1130.00	1280.10	9.45	160.00	390.10	6.72
755.00	1105.10	8.77	1170.00	1320.10	9.41	140.00	410.10	6.82
852.17	1202.27	9.48	1190.00	1340.10	9.33	130.00	420.10	6.95
916.96	1267.06	9.60	1230.00	1380.10	9.45	110.00	440.10	6.82
1014.13	1364.23	9.01	1250.00	1400.10	9.53	100.00	450.10	6.85
1078.91	1429.01	8.59	1290.00	1440.10	9.57	80.00	470.10	6.97
1176.09	1526.19	8.57	1310.00	1460.10	9.70	70.00	480.10	6.84
1240.87	1590.97	8.87	1350.00	1500.10	10.03	50.00	500.10	6.88
1338.04	1688.14	9.41	1370.00	1520.10	10.11	40.00	510.10	6.84
1402.83	1752.93	9.79	1410.00	1560.10	10.48	20.00	530.10	6.78
1500.00	1850.10	11.04	1430.00	1580.10	10.76	10.00	540.10	7.24

Frequency Mixer

TUF-ED12599/1

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)					@LO (dBm)		
	+14	+17	+20	+14	+17	+20			+14	+17	+20
10.10	71.45	80.72	77.63	54.38	55.20	56.04	40.10	10.1	51.22	51.11	51.28
70.10	90.00	86.94	87.24	39.01	40.97	43.05	100.10	70.1	43.42	43.49	43.55
130.10	81.24	78.95	77.89	34.47	36.98	39.66	160.10	130.1	39.73	39.86	39.92
190.10	74.85	77.48	79.14	31.68	34.39	37.50	220.10	190.1	37.33	37.51	37.70
250.10	70.10	72.78	75.69	29.88	33.13	36.09	280.10	250.1	35.75	35.86	36.15
300.10	67.46	68.29	68.25	28.89	32.09	34.77	330.10	300.1	34.74	34.81	34.71
360.10	65.20	65.31	65.01	28.00	31.05	33.58	390.10	360.1	33.40	33.13	33.23
410.10	62.70	61.43	59.48	27.12	30.27	32.91	440.10	410.1	32.01	31.65	31.88
470.10	58.21	57.51	57.30	26.26	29.05	31.47	500.10	470.1	30.60	30.36	30.39
520.10	55.05	54.88	55.14	25.40	28.45	30.88	550.10	520.1	29.94	29.79	29.75
580.10	52.92	52.94	52.61	24.49	27.14	30.13	610.10	580.1	29.43	29.01	28.83
630.10	51.42	52.84	53.12	24.36	26.49	29.01	660.10	630.1	28.87	28.57	28.28
690.10	50.11	51.13	50.91	24.23	26.21	28.27	720.10	690.1	27.72	27.31	27.19
740.10	48.56	49.75	49.82	24.26	26.14	27.91	770.10	740.1	27.30	27.10	26.92
800.10	47.60	48.86	48.90	23.94	25.77	26.50	830.10	800.1	27.86	27.65	27.61
850.10	47.32	47.45	47.37	23.43	25.07	25.48	880.10	850.1	29.32	28.74	28.87
910.10	47.26	46.78	46.56	22.86	24.15	24.47	940.10	910.1	32.84	31.62	31.82
960.10	48.73	47.53	46.51	22.81	23.78	23.91	990.10	960.1	37.11	35.77	34.57
1020.10	50.83	48.72	47.73	22.63	23.21	23.19	1050.10	1020.1	45.98	40.95	38.60
1070.10	52.00	50.46	49.24	22.57	22.85	22.65	1100.10	1070.1	42.92	39.80	37.46
1130.10	51.15	50.71	50.35	22.47	22.41	21.95	1160.10	1130.1	37.02	34.60	33.09
1180.10	49.40	49.18	49.49	22.49	22.17	21.55	1210.10	1180.1	34.05	32.33	30.89
1240.10	48.61	48.91	49.80	22.53	21.72	20.57	1270.10	1240.1	31.54	29.94	28.89
1290.10	46.88	47.53	47.85	22.51	21.05	18.88	1320.10	1290.1	29.82	28.75	28.48
1350.10	46.71	47.63	47.84	21.73	19.08	17.23	1380.10	1350.1	28.38	27.51	27.04
1400.10	47.55	49.04	49.04	20.37	17.76	16.47	1430.10	1400.1	27.22	26.60	26.28
1460.10	49.36	51.23	51.59	18.49	16.71	15.68	1490.10	1460.1	26.41	26.12	26.05
1510.10	50.42	50.17	47.98	17.73	16.22	15.14	1540.10	1510.1	26.06	26.29	26.31
1570.10	47.42	47.47	45.91	16.60	15.43	14.56	1600.10	1570.1	25.67	26.52	26.93
1620.10	46.72	47.72	46.56	15.93	14.99	14.12	1650.10	1620.1	25.15	26.37	27.20
1680.10	46.07	47.02	46.04	14.94	14.31	13.65	1710.10	1680.1	24.65	25.89	26.95
1730.10	45.85	46.29	45.78	14.19	13.76	13.25	1760.10	1730.1	24.24	25.62	26.53
1790.10	46.64	47.11	45.27	13.39	13.20	12.87	1820.10	1790.1	23.58	25.41	26.29
1840.10	46.13	48.68	47.35	12.80	12.74	12.49	1870.10	1840.1	23.45	25.27	26.27
1900.10	46.21	51.63	52.07	12.17	12.22	12.15	1930.10	1900.1	23.25	25.03	26.08
1950.10	46.55	52.19	52.96	11.67	11.85	11.85	1980.10	1950.1	23.58	25.20	26.12
2010.10	46.02	52.60	56.59	11.14	11.40	11.68	2040.10	2010.1	23.97	25.83	26.74
2060.10	45.64	54.95	58.93	10.84	11.08	11.45	2090.10	2060.1	24.46	26.45	27.55
2120.10	45.90	57.76	55.98	10.53	10.77	11.18	2150.10	2120.1	25.50	27.66	28.83
2170.10	44.81	55.00	51.83	10.23	10.48	10.77	2200.10	2170.1	26.55	28.63	30.02

Frequency Mixer

TUF-ED12599/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=550MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+14	+17	+20		+14	+17	+20		+14	+17	+20
40.10	10.1	1.45	1.29	1.24	10.10	1.36	2.67	9.79	10.00	2.00	1.54	1.28
100.10	70.1	1.42	1.21	1.09	70.10	1.07	1.73	2.88	20.00	2.01	1.54	1.28
160.10	130.1	1.43	1.20	1.07	130.10	1.03	1.63	2.49	30.00	2.00	1.53	1.27
220.10	190.1	1.45	1.23	1.11	190.10	1.05	1.54	2.27	40.00	1.99	1.52	1.26
280.10	250.1	1.51	1.26	1.15	250.10	1.08	1.57	2.31	50.00	2.01	1.54	1.28
330.10	300.1	1.51	1.27	1.18	300.10	1.13	1.56	2.25	60.00	2.02	1.54	1.28
390.10	360.1	1.52	1.31	1.24	360.10	1.17	1.60	2.30	70.00	2.02	1.54	1.28
440.10	410.1	1.56	1.36	1.28	410.10	1.20	1.61	2.28	80.00	2.03	1.56	1.30
500.10	470.1	1.64	1.46	1.39	470.10	1.29	1.68	2.33	90.00	2.03	1.55	1.29
550.10	520.1	1.74	1.55	1.48	520.10	1.35	1.74	2.38	100.00	2.01	1.53	1.27
610.10	580.1	1.94	1.75	1.63	580.10	1.41	1.79	2.41	110.00	2.02	1.54	1.27
660.10	630.1	2.15	1.98	1.86	630.10	1.49	1.87	2.51	120.00	2.03	1.55	1.28
720.10	690.1	2.45	2.24	2.13	690.10	1.59	1.91	2.50	140.00	2.02	1.54	1.28
770.10	740.1	2.76	2.48	2.33	740.10	1.67	1.96	2.50	150.00	2.05	1.57	1.30
830.10	800.1	3.14	2.68	2.45	800.10	1.78	2.05	2.54	170.00	2.04	1.55	1.28
880.10	850.1	3.44	2.90	2.63	850.10	1.86	2.18	2.64	180.00	2.02	1.54	1.28
940.10	910.1	3.61	3.22	2.86	910.10	1.92	2.30	2.80	200.00	2.03	1.54	1.28
990.10	960.1	3.60	3.38	3.04	960.10	1.99	2.34	2.86	210.00	2.04	1.55	1.29
1050.10	1020.1	3.58	3.41	3.19	1020.10	2.09	2.40	2.91	230.00	2.07	1.58	1.31
1100.10	1070.1	3.49	3.31	3.15	1070.10	2.16	2.42	2.89	240.00	2.06	1.56	1.29
1160.10	1130.1	3.48	3.34	3.17	1130.10	2.25	2.45	2.89	260.00	2.07	1.57	1.30
1210.10	1180.1	3.44	3.30	3.13	1180.10	2.31	2.44	2.81	270.00	2.05	1.55	1.28
1270.10	1240.1	3.36	3.16	2.94	1240.10	2.39	2.42	2.75	290.00	2.07	1.57	1.30
1320.10	1290.1	3.32	3.03	2.78	1290.10	2.43	2.35	2.62	300.00	2.07	1.58	1.31
1380.10	1350.1	3.13	2.75	2.55	1350.10	2.48	2.34	2.61	320.00	2.08	1.58	1.31
1430.10	1400.1	3.08	2.65	2.48	1400.10	2.59	2.37	2.64	330.00	2.09	1.59	1.32
1490.10	1460.1	2.82	2.47	2.35	1460.10	2.79	2.56	2.78	350.00	2.07	1.57	1.30
1540.10	1510.1	2.76	2.40	2.27	1510.10	3.18	2.78	2.89	360.00	2.11	1.60	1.33
1600.10	1570.1	2.60	2.33	2.19	1570.10	3.60	3.02	3.03	380.00	2.06	1.57	1.30
1650.10	1620.1	2.59	2.26	2.12	1620.10	4.24	3.29	3.18	390.00	2.09	1.60	1.33
1710.10	1680.1	2.66	2.27	2.10	1680.10	4.80	3.54	3.26	410.00	2.07	1.57	1.30
1760.10	1730.1	2.72	2.25	2.07	1730.10	5.39	3.82	3.42	420.00	2.08	1.58	1.31
1820.10	1790.1	3.00	2.35	2.13	1790.10	6.07	4.13	3.52	440.00	2.09	1.59	1.31
1870.10	1840.1	3.03	2.35	2.10	1840.10	6.26	4.33	3.65	450.00	2.08	1.58	1.31
1930.10	1900.1	3.33	2.46	2.15	1900.10	6.89	4.73	3.78	470.00	2.09	1.60	1.32
1980.10	1950.1	3.27	2.47	2.15	1950.10	6.83	4.80	3.87	480.00	2.05	1.56	1.29
2040.10	2010.1	3.47	2.53	2.15	2010.10	7.31	5.16	4.01	500.00	2.09	1.59	1.32
2090.10	2060.1	3.60	2.58	2.12	2060.10	7.34	5.31	4.16	510.00	2.03	1.55	1.28
2150.10	2120.1	3.56	2.52	2.05	2120.10	7.28	5.54	4.43	530.00	2.08	1.59	1.31
2200.10	2170.1	3.79	2.57	2.13	2170.10	7.20	5.85	4.54	540.00	2.01	1.54	1.28

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	7	33	14	38	17	47	29	45	31	49
1	-	27	+0	44	14	39	31	40	40	45	30	54
2	67	67	49	72	52	77	51	70	55	71	58	80
3	>90	74	48	75	46	75	46	72	50	68	68	74
4	>90	>82	75	>82	75	>82	73	>82	70	>82	76	>82
5	>90	>82	>82	>82	>82	>82	>82	>82	81	>82	79	>82
6	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
7	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
8	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
9	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
10	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 380.1 MHz; -1.00 dBm.
LO IN: 350.1 MHz; +17.00 dBm
IF OUT: 30 MHz; -7.51 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	18	43	27	49	31	60	47	66	46	67
1	-	27	+0	46	14	41	37	46	52	52	42	59
2	47	58	43	63	44	83	40	67	46	78	65	70
3	70	57	38	69	35	63	34	63	38	59	54	64
4	>90	92	65	84	69	79	66	75	58	78	61	75
5	>90	77	55	80	47	76	45	82	46	68	51	65
6	>90	89	81	88	83	89	70	89	62	88	58	80
7	>90	82	75	85	68	90	61	83	62	81	60	78
8	>90	>93	>93	>93	>93	>93	83	>93	74	>93	73	>93
9	>90	>93	78	>93	83	>93	78	>93	71	>93	69	>93
10	>90	>93	85	>93	88	>93	91	>93	88	>93	79	>93
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 380.1 MHz; 9.00 dBm.
LO IN: 350.1 MHz; +17.00 dBm
IF OUT: 30 MHz; 2.56 dBm

- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.